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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,019	09/30/2003	Harry Fuerhaupter	ATODP0100US	4826

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EXAMINER	
CULBERT, ROBERTS P	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 01/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/675,019	FUERHAUPTER ET AL.	
	Examiner	Art Unit	
	Roberts Culbert	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) *19-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18 and 24-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/3/05*. *10/17/03, 1/2/04*
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Species I in the reply filed on 10/21/05 is acknowledged. The traversal is on the ground(s) that it is not unreasonably burdensome to search all species. This is not found persuasive because a search for all species would represent an undue burden on examination.

The requirement is still deemed proper and is therefore made FINAL.

Claims 19-23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 8 10, 12, 13, 26 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,028,513 to Murakami et al.

Murakami teaches a process to improve adhesion of dielectric materials to a metal layer comprising: providing an unpatterned metal layer (2) having a first major surface, micro-roughening the first major surface to form a micro-roughened surface and etching the metal layer to form a circuit pattern the metal layer, wherein the micro-roughening is carried out prior to the etching.

Regarding Claim 2, the unpatterned metal layer is not treated to increase surface roughness prior to the micro-roughening.

Regarding Claim 3, the micro-roughened surface is not subjected to further roughening following the etching.

Regarding Claim 4, the cross sectional area of the circuit pattern is not further reduced subsequent to the etching.

Regarding Claim 8, Murakami teaches applying an etch resist (4) to the micro-roughened surface and patterning the etch resist prior to the etching

Regarding Claim 10, Murakami teaches applying a secondary metal coating (3) to the circuit pattern.

Regarding Claim 12, Murakami teaches a copper metal layer (2).

Regarding Claim 13, the metal layer may comprise a copper layer (2) and a second metal layer (3)

Regarding Claims 26 and 27, the micro-roughened surface covers about 90% or substantially all of the first major surface.

Claims 1-4, 8-12, 26-33 and 36-41 are rejected under 35 U.S.C. 102(a) as being anticipated by U.S. Patent 6,500,349 to Andresakis et al.

Regarding Claim 1, Andresakis et al. teach a process to improve adhesion of dielectric materials to a metal layer comprising: providing an unpatterned metal layer (copper foil) having a first major surface, micro-roughening the first major surface to form a micro-roughened surface (Col. 4, lines 44-47) and etching the metal layer to form a circuit pattern the metal layer, wherein the micro-roughening is carried out prior to the etching.

Regarding Claim 28, Andresakis et al. teach a process to improve adhesion of dielectric materials to a metal layer comprising providing an unpatterned metal layer having a first major surface, micro-roughening the unpatterned metal layer with solution to form a micro roughened surface on the first major surface, applying an etch resist to the micro-roughened surface, patterning the resist, (Col. 6, Lines 1-2) etching the metal layer which is not protected by the resist to form a circuit pattern (Col. 6, Lines 14-20) and removing the resist (Col. 6, Lines 23-25) wherein the micro-roughened surface is not subjected to a further roughening. (Col. 7, Lines 18-21)

Regarding Claim 36, Andresakis et al. teach a process to improve adhesion of dielectric materials to a metal layer comprising providing an unpatterned metal layer having a first major surface, micro-roughening the unpatterned metal layer with solution to form a micro roughened surface on the first major surface, applying an etch resist to the micro-roughened surface, patterning the resist, (Col. 6, Lines 1-2) etching the metal layer which is not protected by the resist to form a circuit pattern (Col. 6, Lines 14-20) and removing the resist (Col. 6, Lines 23-25) and optionally applying a secondary metal coating (Col. 7, Lines 22-27) and dielectric (Col. 7, lines 1-8) to the micro-roughened surface.

Regarding Claims 2, 29, and 37 the unpatterned metal layer is not treated to increase surface roughness prior to the micro-roughening.

Regarding Claims 3 and 38, the micro-roughened surface is not subjected to further roughening following the etching. (Col. 7, Lines 18-21)

Regarding Claims 4, 30 and 39, the cross sectional area of the circuit pattern is not substantially further reduced subsequent to the etching.

Regarding Claim 8, Andresakis et al. teach applying an etch resist to the micro-roughened surface and patterning the etch resist prior to the etching. (Col. 5, Line 36 – Col. 6, Line 14)

Regarding Claim 9, Andresakis et al. teach removing the etch resist. (Col. 6, Lines 23-25)

Regarding Claims 10, 31 and 40, Andresakis et al. teach applying a secondary metal coating to the circuit pattern. (Col. 7, Lines 22-27)

Regarding Claims 11 and 32, Andresakis et al. teach applying a dielectric material to the circuit pattern. (Col. 6, Line 41 – Col. 8, Line 11)

Regarding Claim 12, 33 and 41, Andresakis et al. teach a copper metal layer.

Regarding Claims 26 and 27, Andresakis et al. teach that the micro-roughened surface covers about 90% or substantially all of the first major surface since the entire foil is treated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,500,349 to Andresakis et al. in view of U.S. Patent 6,562,149 to Grieser et al, U.S. Patent 6,036,758 to Fairweather, and U.S. Patent 4,637,899 to Kennedy, Jr.

Andresakis et al. teach the method of the invention substantially as claimed, but does not expressly teach cleaning and preconditioning with water-soluble alcohol and corrosion inhibitor prior to micro-roughening. However the steps of cleaning and conditioning prior to micro-etching are old and well known in the art. For example, Grieser teaches the known steps of cleaning and conditioning (predipping) with a corrosion inhibitor prior to micro roughening. (Col. 5, Lines 43-45) Fairweather teaches cleaning and conditioning prior to micro-roughening (Col. 4, Lines 15-23) Kennedy Jr. teaches corrosion inhibitor solutions containing water soluble alcohol in order to improve solubility, lower freezing point etc. (Col. 3, lines 17-37)

It would have been obvious to one of ordinary skill in the art at the time of invention to perform cleaning and pre-conditioning steps in order to prepare the substrate for micro-roughening in the well known manner.

Claims 13-15, 34, 35, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,500,349 to Andresakis et al. in view of U.S. Patent Application Publication 2003/0029730 to Lee et al.

Andresakis et al. teach the method of the invention substantially as claimed, but does not expressly teach using a layer of copper and a layer of 64% iron and 36% nickel. However, Lee et al teach that Copper-invar-copper (CIC) may be used to form circuit elements having low thermal expansion. It would have been obvious to one of ordinary skill in the art at the time of invention to use the copper-invar-copper composite of Lee et al. in the method of Andresakis in order to form circuit elements having low thermal expansion. Note that Lee et al. also teaches that the CIC material may be treated to improve adhesion properties. (Paragraph 41)

Claims 5, 16-18, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over . 103(a) as being unpatentable over U.S. Patent 6,500,349 to Andresakis et al. in view of U.S. Patent 6,261,466 to Bayes et al.

Regarding Claims 16-18, Andresakis et al. teach the method of the invention substantially as claimed, but does not expressly teach using water, acid, oxidant, and corrosion inhibitor.

Bayes et al. teach a micro-roughening treatment for copper to improve adhesion to polymers comprising treating with a solution of water, acid (sulfuric), oxidant (hydrogen peroxide), and corrosion inhibitor (tetrazole).

It would have been obvious to one of ordinary skill in the art at the time of invention to the micro-roughening solution of Bayes to perform the micro-roughening step of Andresakis because Bayes teaches (See Col.1-6 of Bayes et al.) that the solution may be advantageously substituted for the prior art black-oxide type roughening that is described in Andresakis at Col. 4, Lines 44-59.

Regarding Claim 5, Bayes teaches cleaning prior to micro-roughening (Col. 6,Lines 21-35).

Regarding Claims 24 and 25, Andresakis et al. teach the method of the invention substantially as claimed, but does not expressly teach the amount of metal removed or the resulting roughness produced by the micro-roughening solution. However, since the prior art teaches the same micro-etching solution

and etches the same material copper the surface limitations would necessarily be produced by one of ordinary skill in the art of using such solutions to form an adhesion surface.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

R. Culbert
Examiner
Art Unit 1763

Parviz Hassanzadeh
Supervisory Patent Examiner
Art Unit 1763